

AFRICA RISING - Enhancing partnership among Africa RISING, NAFKA and TUBORESHE CHAKULA Programs for fast tracking delivery and scaling of agricultural technologies in Tanzania

Quarterly Progress Report (1 April – 30 June 2015)



30 June, 2015

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Contract No. xxxx

IITA – International Institute of Tropical Agriculture

QUARTERLY PERFORMANCE REPORT

(1 April 2015 – 30 June 2015)

THEMATIC IMPLEMENTING PARTNERS

AfricaRice – Rice Systems

AVRDC – Vegetables

CIMMYT – Maize Systems

IITA – Postharvest and Nutrition

COVER PHOTO

Farmers showing off their first harvest of eggplant ‘Tengeru White’, a newly introduced variety through this project in Babati (Photo credit: Philipo Joseph, AVRDC)

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List of Acronyms

AfricaRice	Africa Rice Center
Africa RISING	Africa Research in Sustainable Intensification for the Next Generation
ARI Hombolo	Agricultural Research Institute, Hombolo
ARI Ilonga	Agricultural Research Institute, Ilonga
ARI Mikocheni	Agricultural Research Institute, Mikocheni
ASA	Agricultural Seed Agency
AVRDC	The World Vegetable Center
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
DAICO	District Agriculture, Irrigation and Cooperative Officer
FtF	Feed the Future
GAP	Good agronomic practices
HORTI-Tengeru	Horticultural Research and Training Institute-Tengeru
ICRAF	World Agroforestry Center
IITA	International Institute of Tropical Agriculture
ILSSI	Innovation Lab on Small-Scale Irrigation
NAFAKA	Tanzania Staples Value Chain Activity
SUA	Sokoine University of Agriculture
TUBOCHA	Tuboreshe Chakula (FtF Project)
VBAA	Village-based Agricultural Agent
WEMA	Water Efficient Maize for Africa
ZOI	(FtF) Zone of Influence

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I EXECUTIVE SUMMARY

During the third quarter, the Africa RISING-NAFAKA-TUBOCHA partnership and scaling project has accomplished a variety of activities. The project GIS postdoc was recruited and a draft M&E framework for the project was developed. The maize, rice and vegetables teams continued to manage the demonstration gardens with improved crop varieties and agronomic practices. For the vegetables team, in addition to the nine sites in three districts already established, five more sites were selected in Kilosa (1), Mvomero (1) and Kilombero (3) Districts in Morogoro Region. The postharvest team also selected six sites in Kongwa, Kiteto and Mvomero where demonstrations will be established. Field days were held by the maize team – 4 in Kilosa, 1 each in Kongwa and Kiteto, and 2 in Babati Districts. The rice team held one field day in Mbeya Region. These provided opportunities for farmers, local government staff, research institutes and the private sector to interact and learn from the project activities. In addition, all teams have developed training materials which will be used to train farmers and other partners. The rice team has come up with information that will enable the development of a locally fabricated weeder. The team is also progressing well with the development of a RiceAdvice-Weeds' tool and processing of data on good agronomic practices. A rice value chain activity is progressing, comprised of experimental auction, constraint surveys and training of partners as well as meetings with platform members. In terms of project performance against FtF indicators, 40% of farmers are applying technologies and only 5% of rice hectares are under improved technologies. These being outcome indicators, performance is expected to immensely increase during the next year. For other indicators which are output oriented, 96.7% of individuals have received food security training, 47.8% of private enterprises and farmers' organizations are receiving USG assistance, 77% of rural households are benefitting and over 100% of target households have home gardens as a result of this project. During the next quarter, all teams will focus on training of farmers and partners in various relevant topics (agronomy, group strengthening, post-harvest practices), participatory variety selection of innovations for scaling and finalization of some products (e.g. weeder) which were not completed this quarter. Also, the vegetables and rice teams will implement surveys to inform future activities. Other activities will include an annual planning meeting for the project, finalization of the M&E framework and scaling strategy, planning for launching of scaling activities in Mbeya and Iringa Regions and formation of R4D/Innovation Platforms to facilitate scaling.

2 INTRODUCTION

2.1 Project description

Africa RISING partners are involved in identifying and developing best performing interventions for improving agricultural production. These are compiled into information and technology packages to be delivered through a network of NAFKA, TUBOCHA, and other public and private sector actors, creating an opportunity for mainstreaming into wider rural development programs. Attractive interventions include the introduction of improved crop varieties, dissemination of best-bet crop management packages, rehabilitation and protection of natural resources, and improvements in food and nutrition security. The main project description has been further refined with activity specifications during the thematic work plan developments, briefly described below.

The project focus is on three crop enterprises – maize, rice and vegetables with post-harvest handling and nutrition as a cross-cutting theme. The key partners in the project include international agricultural research centers (IITA, CIMMYT, AfricaRice, CIAT, ICRAF and ICRISAT), the World Vegetable Center (AVRDC) and two USAID-funded projects, NAFKA and TUBOCHA. These work in partnership with national institutions (research and universities) as well as local government authorities to deliver on the following objectives:

1. Introduce and promote improved and resilient varieties of food crops to farm households in a manner that complements their on-going farm enterprises, contributes to sustainable agricultural resource management, and offers nutritional advantages and alternative market channels;
2. Disseminate best-bet agronomic management packages around the most promising new crop varieties suited to widely representative agro-ecological zones and market proximity;
3. Protect land and water resources and foster agricultural biodiversity through the introduction of soil and water management practices;
4. Increase food security and improve household nutrition among the most vulnerable households and their members, especially women and children, by introducing locally adapted and nutrient-rich vegetables;
5. Introduce and promote postharvest management technologies for maize, rice, legumes, and selected vegetable crops to reduce losses and bring quality up to market standards;
6. Offer and expand capacity services to members of grassroots farmers' associations, platform partners and development institutions in the scaling process (capacity building), paying particular attention to the special opportunities available to women farmers as technical and nutritional innovators and resource managers.

3 IMPLEMENTATION PROGRESS

3.1 Project Management

The project partners have continued making efforts to work together to achieve the project goal. A postdoctoral GIS specialist joined the team in June 2015, and he will play a role in synthesis of data that will enable the project team to target promising project interventions to suitable locations during scaling up and out. He will operate from the Arusha IITA office. The maize team held an implementation progress and planning meeting in Morogoro (2nd May 2015) with a number of partners from IITA, CIMMYT, NAFKA, CIAT and ICRAF in attendance.

Minutes of the meeting are available on this link (http://africa-rising.wikispaces.com/AR_NAFKA_TUBOCHA_Project). Updates on progress for project activities for each of the five districts were presented and discussed. This meeting came up with a plan of activities for the remaining quarter of the year, which included collecting yield data from the demonstration plots, preparation of an agronomy master plan, field guides for maize, groundnuts, beans, soybean and planning for farmers' field days for each of the districts.

The technology scaling specialist (TSS) held meetings with the Agricultural Seed Agency (ASA) and Mikocheni Agricultural Research Institute (MARI) to jointly devise means of complementing each other in activity implementation. ASA has been given a mandate by the Ministry of Agriculture, Food Security and Cooperatives to boost the rice sector in Tanzania and MARI is in advanced stages of introducing new varieties of maize under the Water Efficient Maize project for Africa (WEMA). Since both activities have a scaling component, it was necessary to meet and devise ways of complementing efforts of each other. The annual planning meeting for the project will be held in July 2015 in Dar es Salaam, and preparations have been finalized in the current quarter. A monitoring and evaluation framework for the project was developed. A scaling strategy is being finalized.

The TSS together with the NAFKA team of agronomists and other field staff has also met regularly to establish the feasibility of using the demonstration sites as well as village-based agricultural agents (VBAA) as a key component of the scaling strategy given the limitations of the current extension system. In general, the model is feasible but requires further refinement in terms of linking the VBAA to other actors in the value chain such that they get timely access to resources such as information, inputs and market information. In addition, the farmers' groups with which the VBAA will work have to be regularly monitored and strengthened. Further, strategies for active engagement of local government extension staff have to be developed by the project to ensure sustainability of the scaling model based on VBAA and demonstration plots.



Maize team review and planning meeting at NAFKA offices in Morogoro, May 2015 (Photo credit: Veronica Uzokwe, IITA)

3.2 Demonstration of improved crop technologies and management practices

Maize system: As reported in the second quarter, improved maize and legume varieties were promoted in 29 selected villages across the five districts as shown in Table I. In general, all the demonstration plots performed well except in a few cases where vagaries of weather and other reasons affected performance as shown.

Table I: Improved maize and legumes established at demonstration sites for scaling. Variety differences for different villages address agro-ecological suitability

District	Village	Maize Hybrid	Legumes
Babati			
	Seloto-1	MAMH913 and TZH538	
	Seloto-2	TZH538 and TZH536	
	Seloto-3	TZH536 and MAH913	
	Halu-1	TZH536 and SC 627	
	Halu-2	TZH538 and TZH536	
	Matufa	TZH536 and SC 627	
	Eyamango	MERUHB513	Beans- Uyole Njano
	Orng'adida	MERUHB513	Beans- Uyole Njano
	Duduye	MERUHB513	Beans- Uyole Njano
	Eyesam	MERUHB513	Beans- Uyole Njano
	Sangara	MERUHB513	Beans- Uyole Njano
Kongwa	Ndurugumi	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Chang'ombe	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Vihingo	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Ndalibo	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Lengaji	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
Kiteto	Esuguta	NATAH105	
	Ngipa	NATAH105	
	Mbigiri	NATAH105	
	Kaloleni	NATAH105	
	Kiperesa	NATAH105	
Kilosa	Ng'ole	TAN H600 and NATA 104	Cow pea (Vuli II)
	Ulaya	TAN H600 and NATA 104	Cow pea (Vuli II)
	Kitete	TAN H600 and NATA 104	Cowpea (Vuli II)
	Mandela	TAN H600 and NATA 104	Cow pea (Vuli II)
	Maguha	TAN H600 and NATA 104	Cowpea (Vuli II)
Mvomero	Kwadoli	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Dihombo	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Chigugu	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Msufini	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Lukenge	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Hoza	NATAK6Q	Soybean-Line 8 and beans Uyole Njano

In addition to improved crop varieties, Good Agricultural Practices (GAPs) were applied in all villages, which included timely planting, timely weed management, timely fertilizer application, and timely thinning to maintain the recommended plant population. For natural resource management, legumes were planted either as intercrop (beans and cowpeas in Babati) or as a pure stand close to maize (groundnuts in Kongwa or cowpeas in Kilosa) to provide advantages of adding nitrogen to the soil through nitrogen fixation. Tie ridges were also promoted in all districts to demonstrate the need for soil and water conservation.

Generally, in terms of performance, improved varieties performed better than local varieties in all demo sites. However, the improved varieties did not perform to their expected potential due to poor rains and severe drought in most of the locations.

Two key activities took place at the demonstration sites: harvesting and field days. Participatory harvesting of maize and groundnuts in Kiteto and Kongwa Districts was conducted in May and will continue 'til the end of June. During harvesting farmers were involved in visually assessing the performance of varieties under GAP as well as natural resources management technologies used in demonstration plots. Harvesting in the other districts is pending maturity since the plots were planted a bit late. The yield data from all the sites will be processed and shared during the next quarter.

Farmers' preference on maize performance was based on date to maturity, size of cobs and drought tolerance. For instance at Ngipa (Kiteto District) farmers established that NATA H105 had higher yield compared to local varieties under a similar tillage system of flat seedbed on a plot size of 7m x 7.5m. Further, for soil and water management/fertilizer application plots treated with Yaramila fertilizer with tied ridging had better crop performance compared to plots with farmyard manure and Nafaka Plus fertilizer. Complete results from all the sites will be synthesized to inform selection of best packages for scaling. The field days will be presented in the next section.

For the **vegetable team**, nine demonstration plots measuring 160m² (20m x 8m) each were established in nine different locations in three districts. On average, each demonstration served 66 farmers (102, 207 and 285 farmers in Babati, Kiteto and Kongwa districts respectively). The plots were planted with six different varieties of vegetables: one tomato variety (Tengeru 2010), two African eggplant varieties (DB3 and Tengeru White), one African nightshade variety (Nduruma), amaranth (Madiira I) and jute mallow (SUD 2). The locations include Babati District (Maweni, Endadosh and Sagara villages), Kiteto District (Kibaya secondary school and Sunya and Kaloleni villages) and Kongwa District (Chamkoroma, Tubugwe and Songambebe villages). See report cover photograph.

In addition, farmers were trained on the following good agronomic practices:

- (i) Soil preparation practices (manure, fertilizer use) and handling of seedlings
- (ii) Weeding practices
- (iii) Proper water management for vegetables
- (iv) Fertilizer application
- (v) Integrated pest management
- (vi) Harvesting – when to harvest especially with respect to leafy vegetables in order to maintain a healthy stock.

In May 2015, the team selected pilot villages in Morogoro Region in partnership with another partner, AfricaRice, to introduce a rice-vegetable crop rotation in three pilot villages in Kilombero district. These include Msufini, Ichonde and Kisawasawa. The intervention in the three villages will focus on utilizing residual water from rice production to grow vegetables immediately after rice harvest. Two further pilot villages, one in the Kilosa District (Rudewa) and another in Mvomero District, were selected together with partners from the Innovation Lab on Small Scale Irrigation (ILSSI) implemented by the International Water Management Institute (IWMI) and Sokoine University of Agriculture (SUA). The pilot villages will benefit from the technology transfer from AVRDC/HORTI-Tengeru in combination with new small-scale irrigation facility innovations implemented by ILSSI.

For the rice system, implementation of the activities started in the second quarter continued. These included:

- (i) *Promotion of motorized paddy weeders:* Farmer-participatory demonstrations of three models of motorized paddy weeders, a single-row and double-row type from India and a double-row type from Japan, are conducted at Kilombero and Morogoro, at two weeding times with an average of 25 farmers, per site per demonstration. Also included was the hand-operated straight spike floating weeder to enable farmers to compare the performance and ease of operation of the motorized weeders with a manual weeder. Apart from the rice farmers, researchers of the national research centers, agricultural extension officers, community development officers, local blacksmiths and representatives from the local governments and NGOs were invited.
- (ii) *Development of an electronic decision support tool to aid with weed management:* The model for this tool is being generated by AfricaRice, while the programming will be done by a consultant from Co-capacity, in Wageningen, The Netherlands. The first matrix structure with 88 characterizations and 52 weed management strategies (4,576 choice options) has been reviewed and updated. This will serve as the base-model behind the decision support tool. Detailing the weed management recommendations associated with these 4,576 choice options is ongoing. Programming work by Co-capacity is planned to start in the last week of June, 2015.
- (iii) *Efficiency of foliar sprays under different rice growing conditions and their economic implication on rice farmers:* Thirty (30) on-farm demonstrations have been conducted in Kilombero (irrigated and rainfed rice growing conditions) and Morogoro (upland rice growing condition). To capture the efficiency of foliar nutrients in rice under different rice growing environments, the demonstrations were conducted in three different major rice growing environments: 1) irrigated lowlands, 2) rainfed lowlands and 3) rainfed uplands.
- (iv) *Farmer-participatory on-farm Good Agricultural Practices (GAP) demonstration in Kilombero:* This activity is being undertaken in partnership with KATRIN-ARI. Four GAP component technologies were introduced to 30 farmers in five villages namely Lungongole, Kiberege, Lumemo, Michenga and Sagamaganga in Kilombero. There were 6 demonstrations per village. The four GAP components introduced and demonstrated were: 1) bunding & leveling; 2) use of certified seed (variety - SARO5; 3) line planting; and 4) soil fertility management using optimum rates of NPK fertilizer. The size of the bunds are 30cm thickness and 30cm by height. Dibbling in lines was done with a spacing

of 20cm x 20cm for fertilizer rates at Urea:TSP:MoP at 175:100:40kg/ha. The sources of NPK were Urea for N, TSP for P and MoP for K and the exact amount of fertilizer applied in a field of 200m² are as presented in Table 2 below. The demonstrations are progressing well in all 30 fields.

Table 2: Fertilizer rate used in the 30 GAP demonstration plots in Kilombero

<i>Time of application</i>	<i>Urea (kg)</i>	<i>Triammonium Single Phosphate -TSP (kg)</i>	<i>Muriate of Potash - MoP (kg)</i>
Basal at sowing	1.5	2	0.4
1st top dressing (20 days after sowing)	1	0	0
2nd top dressing (40 days after sowing)	1	0	0.4
Total	3.5	2	0.8

3.3 Field days and farmer exchange visits

As a means of sharing project results with farmers beyond the learners, and other stakeholders, field days were organized by the maize and rice teams. The vegetables team will hold the days during the fourth quarter. For the **maize team**, field days were held in Babati, Kongwa, Kiteto and Kilosa Districts; they will be held in Mvomero District during the next quarter. For the **rice team**, field days were held in Mbeya region (Kyela). In all cases, local government staff, staff from agricultural research institutes (ARI Ilonga and ARI Hombolo), input dealers and media attended as a sign of support for the project activities. Table 3 shows a summary of locations and participants at each site.

Table 3: Field days held in project locations

Location (District)	Location (Village)	Number of participants	team
Kiteto	Ngipa	202	Maize
Kongwa	Ndurugumi	104	
Babati	Riroda, Gallapo	85	
	Gallapo	125	
Kilosa	Kitete	383	
	Ng'ole	141	
	Ulaya	178	
	Magua	278	
Kyela	Kilasilo	80	Rice

During the field days, the farmers were enthusiastic about the performance of the different improved varieties and practices - NATA H 105 in Kiteto; NATA KQ6 in Kongwa and the legumes; Meru Agro HB513 in Babati (despite the challenges of severe drought) and, NATA 104 as well as legumes in Kilosa (Research staff from ARI Ilonga also used the opportunity at Kilosa to show farmers other varieties of legumes that are suitable to the agro-ecosystem and were eager to further test it with the project team and farmers).



Farmer field day in Kiteto District (Photo credit: Elirehema Swai, ARI Hombolo)

In addition to the field day, the rice team also conducted farmer trainings on 16 and 17 April 2015 and on 10 and 11 June 2015 involving 70 farmers from Mbako and Kilasilo villages. After each farmer exchange field visit the participating farmers were interviewed. General information about each farmer, including farm size, crops cultivated, parasitic weed and non-parasitic weed, disease and other constraints in rain-fed rice production, their opinions and expectations before crop maturity on the management strategies tried on the on-farm trials, and on what they like/dislike about the innovations they are testing was collected. This data will help in future assessments on adoption. The **vegetables** and **postharvest** teams are planning field days to be held in future.



Farmer field day in Mbeya, June 2015 (Photo credit: Jonne Rodenburg, AfricaRice)

3.4 Improved Household Nutrition and Reduction of Food Waste and Spoilage

The postharvest team did analysis of the baseline data collected last season and developed training materials for trainings that will commence at the end of the third quarter. Preliminary results indicate that over 83% of the farmers in Kongwa, Kiteto and Mvomero Districts lack knowledge and skills on postharvest handling of crop produces.

About 82% of the farmers store their maize produce in polypropylene bags, 13% store in gunny bags, and 5% use granaries. About 85% use pesticides of different kinds in the process of maize storage but they lack skills in proper use in a situation where insect pests were believed to account for 58% of crop loss (poor harvesting practices accounted for about 34% of the loss). Resulting from the results, the team developed training materials for use during the training in postharvest management. Hermetic storage bags were also purchased for use during the training. The team will select demonstration centers (villages) for postharvest handling technologies (shelling, drying, storage and food product development). These included Kwadoli and Msufini villages in Mvomero District; Kiperesa and Ngipa villages Kiteto District and Ndurugumi and Vihingo villages in Kongwa district.

3.5 Community empowerment for sustainability

All the **teams** work with farmers' groups to ensure that the communities are empowered to sustainably intensify their production is done. In Kiteto, Kongwa and Mvomero Districts where NAFKA has a presence, field staff have built the capacities of farmers groups in management and leadership as well as other development aspects (e.g. farming as a business). The groups are also being formed into associations to enable them to benefit from economies of scale. In Babati and Kilosa districts, after establishment of the demonstration sites and working with the groups with the assistance of local government staff (ward and village extension officers), weaknesses have been identified and the capacity building for groups will be done in the subsequent quarters.

In addition to groups, the empowerment model in districts with NAFKA presence also has village based agricultural agents (VBAs) who are trained in agronomy, business and extension approaches which they use to provide better training, information and input services to group members and the wider community. In other districts, lead farmers were selected and trained to provide the same. Exchange visits, especially by participating farmers from Babati and Kilosa Districts to districts with NAFKA presence, will be organized for learning purposes.

In addition to community empowerment through groups and village-based agents, the **rice team** conducted activities on the value chain as briefly presented:

- (i) *Baseline & diagnostic surveys to inform value chain enhancement:* The villages and respondents sampled for the baseline survey were added into the Mlax system. This is the system used by AfricaRice to collect data throughout all the rice sector development hubs. The varieties and crops identified in the villages were also added in the system. The questionnaire can now be downloaded for enumeration. ARI-Ilonga is responsible for the upcoming data collection.

In Mbeya and Morogoro Regions, interviews were conducted with 68 crop protection stakeholders (47 male, 21 female) who included those from government (33), private sector (16), farmers (13) and NGOs (6), as this emerged as one of the main problems in rice systems. The aim was to provide a deeper understanding of: (a) how institutions responsible for providing plant health services in Tanzania are structured and interlinked from the national to the local level; (b) what incentives the private sector, public sector and NGOs or farmer-based organizations have to provide specific prevention and control services; (c) which institutions are dysfunctional and why, which services are missing to make the crop protection system ideal and

well prepared for any future outbreaks; and (d) how information flows to the relevant authorities and what actions are taken when a biotic stress invasion occurs. Data will be presented in subsequent reports.

- (ii) *Experimental auctions*: Experimental auctions were conducted in Morogoro town in April by a team of staff from AfricaRice, NAFKA and ARI-Ilonga. The auctions were attended by 131 participants, (83% of them women) who were randomly selected from two open air local markets (Mawenzi and Morogoro markets). During the experimental auctions, four rice samples were assessed. These included two local varieties: SupaKyela, a variety widely known by consumers, and Mbawambiri, a variety that is grown by many farmers but largely unknown in the market. The third sample was an improved aromatic rice variety (IR05 N221) that is prone to a comparably higher breakage rate, and the fourth was the low-quality rice in terms of visual appearance resulting from poor post-harvest handling. This fourth variety was used as the benchmark. The structure used in experimental design was the Vickrey 2nd auction within which a winner who proposes the highest price pays the second highest bid. Nine sessions were held; each session included 15 participants (except for the first session that comprised 11 participants). In each session, 4 rounds of assessing consumer's willingness to pay were conducted including 3 individual trials and a collective round. The individual trials involved the assessment of the Willingness to Pay (WTP) by each participant of the uncooked rice, the cooked rice and a final individual assessment after the collective round. The collective round involved a discussion and consensus on the willingness to pay by the group made of randomly assigned participants.

For the **vegetables** team, a baseline survey was conducted in the nine villages in Kongwa, Kiteto and Babati Districts covering 360 farmers from all nine pilot villages. The survey aims at providing information on the importance of leafy vegetables for farmers, farmers' access to inputs, finance and markets, as well as the role of women, men and youth in production, management and sale of vegetables. This survey will also form a basis for a follow-up survey scheduled for 2017, in which the adoption of the technologies introduced will be assessed. In addition to the 360 farmers, 86 traders were also interviewed to get access information on leafy vegetable value chains and handling of leafy vegetables after leaving the farm gate. The information generated from the baseline survey will directly feed into the project activities of the second project year. Detailed results of the survey will be presented in the next quarterly report.

4 ACHIEVEMENTS AND RESULTS

General

- (i) A draft monitoring and evaluation framework for the project was finalized for review.
- (ii) A draft scaling strategy for the project was also developed.

Maize system

- (i) Team planning and progress meeting held that led to refinement of team activities for better results
- (ii) Eight field days conducted in the districts of Babati (2), Kiteto (1), Kongwa (1) and Kilosa (4) to share results of the demonstrations and to establish stronger networks with local government, input suppliers for sustained implementation of the promising innovations – 1294 farmers attended.
- (iii) Yield data collected to assess yield advantage of improved varieties under good agricultural practices and natural resource management.
- (iv) Draft field guide for maize, soybean, and beans agronomy developed for use in training.
- (v) Master plan for establishing and managing demonstration plots prepared for further review.
- (vi) Requirements for strengthening of community empowerment (groups, trainers, involvement of local government) started; to be done in detail next quarter.

Rice system

- (i) Data on suitability of the weeders was collected in a participatory manner. The data will be analyzed carefully and based on this a local prototype will be developed. As it looks right now, this will probably be a hybrid between the two types demonstrated, with the weeder tines from the Indian type (for effective weeding) and with the two floaters in front from the Japanese type (for more stability and ease of operation).
- (ii) Good progress is being made regarding development of an electronic decision support tool for weed management. Currently the 52 weed management strategies are being associated with detailed environment and resource specific descriptions.
- (iii) Work on efficiency of soil and foliar applied micronutrients under different rice growing conditions and their economic implication to rice farmers has progressed well. Preliminary results based on field observations indicate that (i) there is a big difference between the NPK and no NPK blocks; (ii) soil applied micro-nutrient plots (NPK+SMN) show a clear positive difference compared to other treatments, (ii) the effect for foliar applied micro nutrients is not clear. In some fields, there are some variations in crop appearance and many instances there is 'no clear difference' noticed. Clearer results will be available after getting the yield data.
- (iv) Participatory on-farm Good Agricultural Practices testing in Kilombero is progressing well on 30 farmers' plots in six villages. Results on performance will be shared in the subsequent quarters.
- (v) Two exchange visits held in Kyela, involving 70 farmers from two villages.
- (vi) One field day held in Kyela where 80 participants attended.
- (vii) From the experimental auction activities, two marketing agents from RUDI and MVIWATA, subcontractors of NAFKA, were trained on the theory and practice of experimental auctions as a tool used in marketing research to elicit consumer preferences. Also

data generated from 131 consumers on their willingness to pay for different rice varieties and rice preference attributes is available and will be processed further to inform future interventions

Vegetables

- (i) Demonstration plots in nine pilot villages have been established, each with six raised seed beds for tomato (Tengeru 2010), African eggplant (Tengeru white and DB3), African nightshade (Nduruma), amaranth (Madiira I) and jute mallow (SUD 2). The crops in all demonstration plots are in very good condition except African eggplant, which suffers from the cold weather during April and May.
- (ii) 149 farmers plus nine village extension officers were trained as part of a ToT approach on GAP, including soil preparation, setting up the demonstration plots, transplanting of seedlings, IPM and management of household plots.
- (iii) The 149 participants of the ToT training plus 451 additional male and female farmers received an AVRDC seedkit containing the above mentioned varieties. Those 517 spill-over beneficiaries have started to set up their own home gardens with support from the 149 farmers, who received the ToT training implemented by AVRDC and HORTI-Tengeru.
- (iv) Five additional villages in Morogoro (Kilombero, Kilosa and Mvomero Districts) have been selected for additional vegetable related activities.

Post-harvest

- (i) Development of training materials for training of farmers in postharvest management.
- (ii) Selection of sites (villages) for demonstration of postharvest management practices.
- (iii) Preliminary analysis of survey data on constraints of post-harvest handling to farmers.

5 PROBLEMS AND CHALLENGES

- (i) Unpredictable weather: The prolonged dry spell in the previous quarter affected results from the demonstrations set up in Babati, Kongwa, Kiteto and Kilosa for maize. Flooding, on the other hand, affected vegetable gardens in Babati District (Maweni, Endadosh, Sunya) and Kongwa District (Chamkoroma). Farmers needed to establish new demonstration plots and did so at a higher elevation.
- (ii) For rice, the variety identified in the market for the auctions, namely the Supa Ifakara, was not available at the time of experimental auctions; another local variety (Mbawambili) was used instead. Moreover, we were supplied with IR05N221 (Komboka) instead of SARO5, which means that part of the data cannot be used as intended and the experiment will have to be repeated as we are targeting SARO5 as the main variety being promoted to farmers as high-yielding and having a market potential.
- (iii) The postharvest team has had constraints filling the gap left behind by TUBOCHA. To fill this gap, the team has identified two local staff familiar with previous TUBOCHA work to link with the beneficiaries in the districts. This took a while.
- (iv) Another operational challenge was with the vegetables team whereby the demonstration plot established at Kibaya secondary school in Kiteto District was not well managed during the school holiday. Follow up on how to better work with the school administration will be done in the next quarter.
- (v) Absence of NAFKA Field Agronomists in Kilosa and Babati poses a challenge to the maize team to manage demonstrations in this district. The team engaged extension officers in some villages to backstop field activities and support farmer groups, but formal arrangements will need to be made in subsequent growing seasons to strengthen this collaboration.

6 PLANNED ACTIVITIES FOR QR4

6.1 General

- (i) A planning meeting for the project will be held at the beginning of the next quarter.
- (ii) With the recruitment of the GIS specialist, baseline data available at NAFKA and other project partners will be accessed for meta-analysis and mapping so as to guide the horizontal scaling of technologies.
- (iii) Formation of R4D/Innovation platforms will be revived for maize and vegetables teams learning from the experience of the ongoing and previous projects in the intervention areas.
- (iv) All teams will do participatory innovation selection with farmers and other actors based on results of the previous harvest to guide better scaling.
- (v) Conduct a reconnaissance visit to Mbeya and Iringa Regions in preparation for the launch of the project in the regions in year 2.
- (vi) Finalize the scaling strategy for the project.

Specific activities for each team include:

6.2 Maize System

- (i) Training of lead farmers in Kongwa, Kiteto, Mvomero, Kilosa and Babati
- (ii) Profiling of groups in non-NAFKA districts in preparation for training in group strengthening
- (iii) Involvement with community leaders in non-NAFKA districts to select farmer trainers
- (iv) Field days in Mvomero District
- (v) Collection and processing of harvest/yield data
- (vi) Participatory variety selection for scaling

6.3 Rice System

- (i) Data from the motorized weeder tests will be analyzed and a report will be generated.
- (ii) A first prototype of a new weeder that can be locally fabricated will be designed based on the farmer feedback data and in close collaboration with the engineering partner Intermech.
- (iii) A first prototype of the electronic decision support tool RiceAdvice-weeds will be generated.
- (iv) Continuation of farmer participatory on-farm GAP demonstrations and data collection, followed by a report.
- (v) Data collection and analysis of the nutrient foliar application work and reporting.
- (vi) Training of value chain actors on identification of constraints and challenges to the value chain development and identify opportunities for an efficient production and marketing system.
Baseline data collection of the sampled households in the villages of rice marketing activities
- (vii) Rice value chain surveys will be held among 170 identified farmers and 185 other value chain actors (including millers, sellers, restaurants etc.)
- (viii) Multi-stakeholder platform meeting.
- (ix) Analysis of crop protection systems in Tanzania, sharing results and agreeing on a way forward.

6.4 Vegetables

- (i) Conducting post-harvest training, as well as food safety and food preparation training including organoleptic tests.
- (ii) Completion of baseline survey and processing of results
- (iii) Field days in the three districts of Kongwa, Kiteto and Babati
- (iv) Collection and processing of yield data in the three districts
- (v) Sensitization meetings and establishment of vegetable nurseries at the sites selected in Morogoro region

6.5 Post-harvest and Nutrition

- (i) Conduct training and demonstration on postharvest handling of cereal products.

7 SPECIAL ISSUES

Many roads where the project operates in Kongwa and Kiteto were in a bad shape during the last quarter. It has been noted that most of those that were impassable then have been repaired with support from USAID and Government of Tanzania. This will make access to communities easier – by the project teams and other actors in the value chain, thereby contributing to improved livelihoods.

8 CROSS-CUTTING ISSUES

8.1 Gender integration

The project is working with men, women and groups. In some cases, only-women and youth farmer groups are being supported. Participation of all these categories in project activities is encouraging. For vegetable-related activities during the sensitization meetings and the establishment of the demonstration plots, the group leaders were sensitized on the importance of including women in several community activities like meetings, decision-making and other economic activities including vegetable farming. There was an observed low participation of women in Babati District (15%) and Kongwa District (35%). In Kiteto District, the situation was different as the number of women (90%) in one village outweighed the number of men, and the average participation was 50%. During further visits to the pilot villages, the project team continued to sensitize the local farmer group leaders and the village extension officers on the importance of including women in the training activities. As a result, the participation of women did increase. Hence, the share of women in the total number of spill-over beneficiaries in the Babati region amounted 21%. This is an increase of 6% compared to the share of women who participated the training sessions in the same region. In the Kongwa district, 3% more women participated as spill-over beneficiaries compared to the percentage in the ToT training sessions. In Kiteto the share of women in the total number of spill-over beneficiaries increased by 16% compared to that in the ToT training sessions and amounts to 66%.

In the rice-based systems work, both men and women have continued to participate in activities (weeding using motorized weeders and marketing). Hence the demonstrations of GAP and motorized paddy weeders as well as the value chain reinforcement work will benefit women at least as much as men. In the experimental auctions held this quarter, the majority of participants (83%) were women. This is because they are mainly the ones who make household consumption decisions. Men were recruited after confirming that they also take part in these decisions. In the assessment of the willingness to pay for different rice varieties, it was noted that men tend to offer higher values than women, in a drive to 'win' the product in the auction system. Women showed better knowledge of rice attributes; their valuations tended to be close to the real market prices.

For maize activities, from the onset of the project activities, the maize based system works with farmer groups in demonstration plots and these groups comprise men and women with a good representation of women. The women and male farmers in all the groups are very active. During field days, there was a good turn up and active participation of both men and women.

8.2 Behavior change communication

For the vegetables-related work, the team uses direct communication, interactive discussions and experience-sharing methods during the sensitization process and during the practical trainings at the demonstration plots, together with the use of key informants such as district and subject matter specialists, local extension agents and the participating farmers themselves. The project interventions led to several behavior changes reported from the pilot villages. As mentioned above, the leafy vegetable jute mallow in all the nine pilot villages was seen as a fodder crop for livestock or weed. The introduction of a new variety of jute mallow (SUD 2) with bigger leaves and a higher yield convinced farmers to grow and consume the crop at home. This was achieved by introduction of a new variety in

combination with emphasizing the rich nutrient-content of the crop. Changes in farmers' production behavior were reported for several farming practices. Based on the hands-on training sessions in the nurseries and the demonstration plots, farmers mentioned that they adapted in particular the soil preparation practices, as well as the varying spacing of different crops. Due to this, farmers were able to save seeds while growing healthier seedlings and plants at the same time.

In the rice-systems work, the innovation platforms established directly contribute to a behavior change as stakeholders improve their communication and mutual understanding. With the rice-based systems GAP demonstrations farmers are exposed to improved but accessible and affordable practices that will contribute to a behavior change at the field level. Rather than continuing with doing their 'business as usual', we expect that farmers will change certain practices and that they will start seeing the opportunities of experimentation on their own farms in order to fine-tune their practices.

During the field days conducted by both the maize and rice teams, it was observed that many farmers are ready to start using improved varieties and management practices as a result of the potential benefits expected from adoption.

8.3. Environmental compliance and natural resource management

For the rice, maize and vegetables-related work, GAP are being promoted to ensure sustainable use of soil and water. For vegetables, the promotion of high yielding vegetable varieties in smallholders' home gardens focuses first and foremost on increasing food security in Tanzanian rural areas and enabling farmers to produce additional surplus that can be marketed on local fresh markets to increase household incomes. Using high yielding and more resistant varieties combined with improved production practices such as appropriate spacing to increase seedling and plant health, as well as other IPM practices may reduce the application of pesticides and chemical fertilizer. This in turn, improves the food safety of the actual products produced by farmers and the contamination of soil with chemical substances. Furthermore, properly established raised seed beds as taught during the ToT training will reduce soil and water erosion in the villages. Where applicable, AVRDC and HORTI-Tengeru will comply with the Environmental Compliance Regulations and Procedures of USAID.

For rice-based work, by demonstration of GAP, foliar nutrition and rotary weeders to rice farmers, the rice-based systems team expects to contribute to reduced use and misuse of pesticides. Currently most of the pesticides used in rice are herbicides. Good agricultural practices will render the crop more competitive against weeds making farmers less dependent on weed intervention technologies. Secondly, by providing farmers with another labor-saving weed intervention technology, the need for herbicides will further reduce. Thirdly, the weed management decision support tool that the rice-based systems team is working on will enhance the basket of options for good and efficient weed management to farmers with lower reliance on herbicides. The use of the foliar nutrition spray and the recommendations of good and timely use of fertilizer will enable rice farmers to increase the fertilizer use efficiency, with obvious benefits for the surrounding ecosystems.

The maize team is promoting natural resource management practices such as integration of legumes in maize cropping, judicious integration of fertilizers, use of tie ridges for soil and water conservation all meant to contribute to natural resource management.

8.4. Monitoring and evaluation

A monitoring and evaluation plan was developed and is in final stages of finalization. FtF indicators to be tracked by the project were selected and approved by the USAID Tanzania mission. These are being used by the project team to report performance progress (see Annex I).

Annexes

Annex I: Performance against year I PMP indicators as of end of quarter 3

Indicator	FY Target	FY Achievement	% Achievement	FY % Female	% Male
1. Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	N/A	N/A			
2. Number of rice hectares under improved technologies or management practices as a result of USG assistance	N/A	N/A			
3. Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	725	701	96.7	41.4	58.6
4. Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance	71	34	47.8		
5. Number of rural households benefiting directly from USG interventions	775	600	77.4	44	56
6. Number of beneficiaries with home gardens or alternate crops as a proxy for access to nutritious foods and income	149	152	102	36.2	63.8

Annex 2: Success stories submitted to USAID Mission during the quarter

Farmers in Ngipa Village, Kiteto District thrilled by performance of maize varieties and agronomic practices

The collective efforts of AFRICA RISING NAFKA and TUBOCHA to up scaling promising agricultural technologies to farmers have started yielding fruits to “Tuelimishe group” (A women’s group) and other farmers in Ngipa village, Kiteto District.

The approach involved demonstration of insitu rain water harvesting (tie ridges) along with use of different types of fertilizers (Yara Milla, Nafaka(+), Minjingu mazao and Farm Yard Manure) and maize variety NATA H105 on the group’s farm during the 2014/15 farming season. “Tuelimishe group” is comprised of 25 women farmers. During the farmers’ field days held in Ngipa village in June 2015, 202 farmers participated to witness and evoke their views on the fabulous agronomic performance of the newly introduced maize variety and the management practices used compared to local practices, i.e. flat cultivation, use of fertilisers and local maize varieties (and other improved varieties).



Farmers participating in a field day in Ngipa village, June 2015

Farmers got inspired, and appreciated the performance of the NATA 105 maize variety planted with tie ridges and applied with Yara Milla basal fertilizer. They were also impressed with the yield performance of the maize variety versus the local variety used by most farmers in the village.



Farmers in their group showing the results of performance of NATA 105 maize variety

As seeing is believing, many farmers, pledged to grow the maize variety next season as well as applying the agronomic practices that led to the impressive performance.